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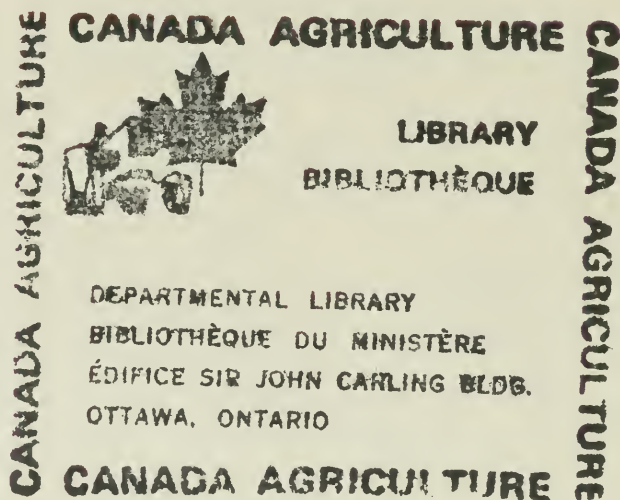
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# MASTITIS CONTROL

Mastitis is inflammation of the udder. Mastitis infection occurs when the natural defenses of the dairy cow break down due to interference or injury, or are otherwise rendered ineffective. Sanitary and mechanical aspects of milking machine operation and handling, living conditions and stress are critical factors.

The best way to control mastitis is to prevent it through good management. Assistance may be provided in many ways, but the person who handles and milks the cows is most important in effective mastitis prevention and control. A continuing program is essential. Once the initial improvements are evident, additional benefits take 4 years or longer to materialize.

Mastitis is the cause of a serious but often unrecognized loss of income to the farmer. The average dairy farmer, if he chose to institute an effective mastitis control program, could in the long run augment his gross income by several thousand dollars a year. For example, in England, a 5-year study of 30 herds concluded that the average increased annual income from milk production in a 100-cow dairy herd ranged from \$745 after the first year to about \$3000 after the 5th year of the program. The annual cost of the program (including the cost of extra feed) was approximately \$440. The ratio of benefit to cost over the 5-year period was 2.55:1. During the first 3 years, the proportion of infected cows was reduced from 57% to 19.6% and that of infected quarters from 29% to 8%.\*

This pamphlet provides some background on mastitis. Call on your provincial fieldman for details of a mastitis control program.

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\* American Dairy Review, Jan. 1977.

## FORMS OF MASTITIS

### Clinical Mastitis

In clinical mastitis, there are signs and symptoms of the disease. Milk shows some abnormalities like flakes or clots and the affected quarter is usually hot, swollen and sensitive.

**Peracute:** This is the most critical form of clinical mastitis. Swelling, heat, redness, pain and disturbed function of the infected quarter are evident, as well as very high fever (often over 41°C), depression, shivering, loss of appetite and rapid loss of weight. In most cases, the cow stops producing milk.

**Acute:** In acute mastitis, there are obvious symptoms of inflammation of the udder, which is swollen and appears the same as for peracute mastitis. The body temperature is over 39°C and the cow shows mild depression, weakness, dull eyes and loss of appetite.

**Subacute:** Mastitis is called subacute when there are no obvious changes in the udder but clots are persistent, especially in the foremilk. The cow does not appear to be affected by the disease.

### Subclinical Mastitis

This form of the disease produces no obvious signs or symptoms. The inflammation is there but you can't see it, as there is no recognizable infection of the udder. Although both the milk and the udder look normal, mastitis organisms are found on laboratory culture and mastitis screening tests (CMT, WMT, Whiteside, etc.) have a high value. This form of mastitis is 15-40 times more common than clinical mastitis, which means it occurs in 60-80% of all mastitis cases.

### Nonspecific or Aseptic Mastitis

In this form of mastitis, causal organisms can't be isolated and the symptoms may be subclinical or clinical.

### Chronic Mastitis

Chronic mastitis occurs when a quarter fails to respond to treatment over a period of time. The inflammatory process persists over many months, or from one lactation period to the next. The udder may become useless and other abnormal changes in the quarter may occur and be present for the rest of the animal's life. Chronic mastitis exists mostly in a subclinical form with periodic

flare-ups producing subacute or acute clinical signs that soon subside, reverting to the subclinical form.

## MASTITIC AGENTS

Many bacteria and other microorganisms such as viruses and yeasts can cause inflammation and, therefore, mastitis in the udder. Many of these organisms are widely distributed in nature and are opportunistic when injury or trauma causes the udder to be susceptible to infection. The type of mastitis is usually named after the type of organism causing it.

*Streptococcus agalactiae*: This mastitis organism is found only in the udder. It creates serious loss of milk production, but can be eradicated because of its limited distribution in nature.

*Staphylococcus aureus*: This organism is widely distributed in the animal environment and is an important cause of mastitis. It frequently develops antibiotic resistance and is almost impossible to eradicate completely.

Other microorganisms: Streptococci, coliforms, pseudomonads, coryneform bacteria and others cause mastitis but are generally less common than *S. agalactiae* and *S. aureus*.

Provincial laboratories have the facilities to conduct the necessary diagnostic tests to determine the type of organism involved and the treatment required.

## Economic Costs to Producers

A number of studies conducted in various dairy countries of the world have shown that mastitis exists in practically every herd. Most of it is in the subclinical and chronic forms and goes undetected.

It has been estimated that in Canada about 50% of the cows are infected in an average of two quarters of the udder. The national herd consists of about 2 million milking cows. It has been calculated that the loss in milk production in an average 40-cow herd is 3855 kg a month; therefore, the national loss is 193 million kg a month. At \$10 per 45 kg, this translates to \$510 million a year in direct production losses. The other costs of mastitis, including death and culling, discarded milk, drugs and veterinary expenses, are estimated to bring the total cost to \$730 million a year. Since the gain in production greatly outweighs the cost of a mastitis control program, a good portion of the \$730 million would become available to farmers if they controlled mastitis effectively.

# MASTITIS DETECTION AND CONTROL

## Detection

Inflammation of the udder causes large numbers of white blood cells (leucocytes) and epithelial cells to be released into the milk. These cells are collectively called body cells (somatic cells). Since a high somatic cell count is a good indicator of inflammation, a high count in milk samples indicates inflammation of the udder or, in other words, mastitis.

When mastitis is very advanced or severe the milk may become flaky, stringy, bloody or wheylike. However, resorting to such indicators as a method of detecting mastitis is like using the onset of labor as a pregnancy test – the information is “too little and too late.” Fortunately, gel tests, such as the Milk Gel Index (MGI) and California Mastitis Test (CMT), can be used by farmers to detect increased somatic cells before abnormal milk occurs.

In laboratories, very precise counts are conducted and other tests are also carried out. Electronic cell-counting instruments are now being used in most major laboratories. Veterinary microbiologists analyze milk samples to find out what agent is causing the mastitis and what antibiotics will be effective for treatment.

Carefully kept production records are another effective way of checking for mastitis. Milk production may drop by 25% with the onset of subclinical mastitis. Long-term production records are a valuable tool in herd management.

Most jurisdictions run cell counts on bulk milk at regular intervals and these cell counts are made available to farmers. Abnormal cell counts are a warning sign that trouble exists.

## Control

Keep in mind that for every dollar a dairyman spends to prevent and control mastitis, he can expect a return of \$3 to \$5 in increased milk production.

Although the mastitis problem is complex, there is no great magic in controlling it. Mastitis is an environmental disease; in other words, the germs are in the stable. What is required to control the disease is a good long-range management program in which all aspects of the dairy-cow enterprise are kept under scrutiny. Some of these are:

Hygiene: High concentrations of bacteria are produced by contaminated water, damp and soiled bedding, poor sanitation of milking equipment and milking wet udders. The transmission of

germs by contaminated hands, clothing and wash cloths is difficult to avoid; cleanliness and care are essential to prevent the distribution of germs.

**Teat condition:** Most mastitis is caused by germs entering the udder through the teat canal. Teat bruises, cracks, chaps, cuts, scratches, wounds, tears, crushing or traumatism of any kind will lead to growth of bacteria at the teat end and their subsequent entry into the canal.

Nonirritating teat dips containing a disinfecting agent and skin conditioners are an important aid in mastitis control.

**Milking machines:** The milking machine is a major reason for the increase of mastitis. Defective milking machines and improper operation irritate the mammary tissues, facilitating infection and the increase of existing inflammation. Vacuum level, vacuum fluctuations, pulsation rate, pulsation ratio, design and characteristics of teat cup liners are important considerations in avoiding irritation. Overmilking increases teat irritation and encourages infection. Milking healthy cows first and infected ones after decreases the spread of disease.

**Housing and cow yards:** Infections are minimized if cows are comfortably housed and cow yards have a hard dry surface free of manure. Trampled teats may be avoided by providing sufficient space and bedding for each cow.

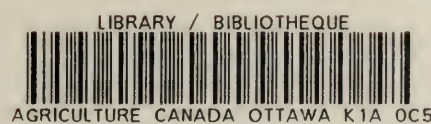
**Replacements:** Mastitis is widespread in the National Dairy Herd. Choose replacements carefully and have all cows tested for mastitis before integrating them into the herd. Ensure that calves are not allowed to suck the undeveloped udders of heifers.

**Dry cow therapy:** It has been well demonstrated that antibiotic treatment of the infected quarter during the dry period is beneficial. It is recommended that teat dips be applied for a few days after drying off.

**Other aspects:** Many other things can influence the susceptibility of cows to mastitis. Feed, condition of the cow, other diseases, level of production, age and ancestry – all can affect mastitis. Stress (fright or pain) results in a reduction in milk production. The higher the level of production, the more susceptible a cow is to stress and mastitis.

## **A Control Program**

There is considerable variation in method and approach for control programs. However, the basic elements of a good control program include:



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- Attention to herd health and comfort, including some form of regular testing for increases in somatic cells caused by the onset of mastitis.
- Proper design, careful maintenance and correct operation of milking equipment.
- Proper milking procedures and good hygiene.
- Teat dipping.
- Dry-cow treatment.

Provincial fieldmen and veterinarians can advise on programs. Most provinces have available some assistance for producers who want to prevent and control mastitis. The benefits greatly exceed the costs.

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This book, published by the Information Services of Agriculture Canada, was prepared by J.A. Elliott, Food Research Institute. It was reviewed by the Mastitis Control Committee of the National Liaison Group on Milk Quality.

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